



# Advanced BACnet / Wireless

January 19, 2018 | The Langham Luxury Hotel, Chicago, IL



# Team Intros Preliminaries

# Preliminaries – Hardware



## Ports 1 & 2:

10/100 BaseT Ethernet

## Wireless LAN:

802.11 a/b/g/n

WPA2/PSK (EAP in works)

## Wireless WAN:

AT&T, Verizon

3G, 4G LTE



# Preliminaries – F00B Nets



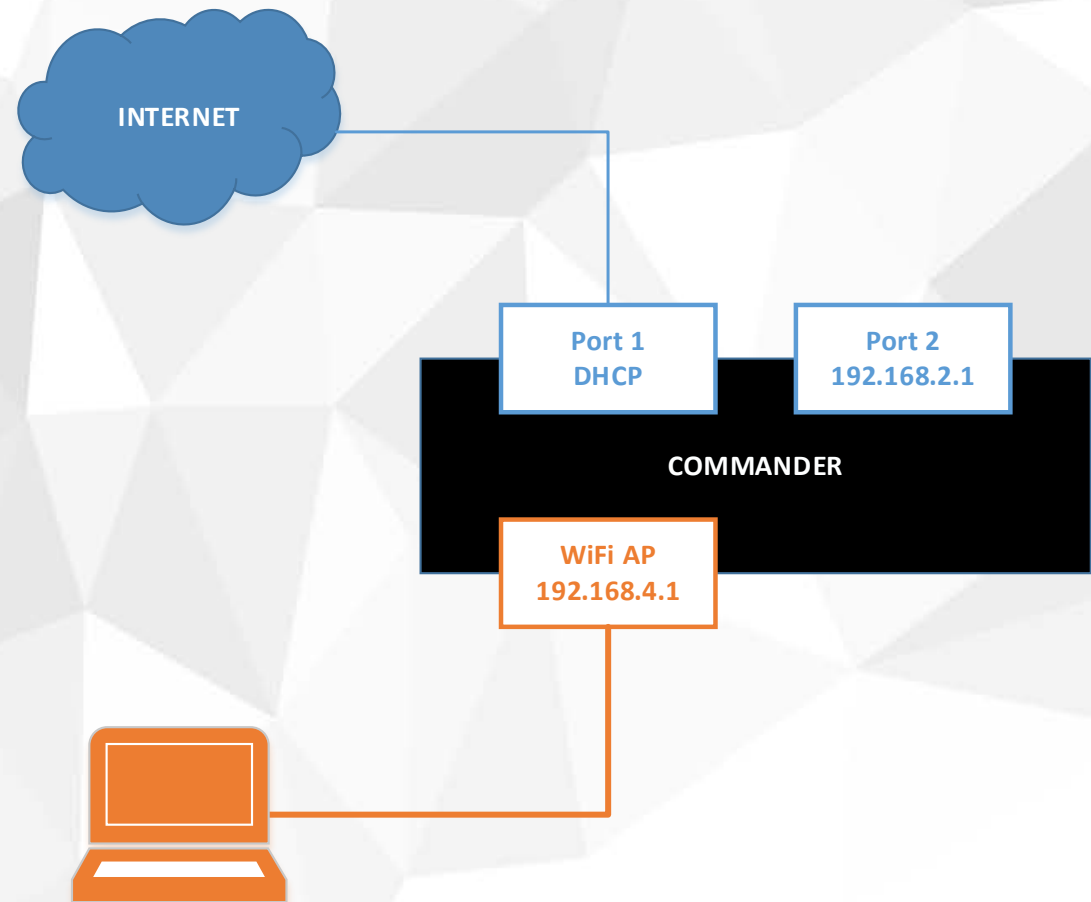
Port 1:  
Dynamic

Port 2:  
Static 192.168.2.1/24

wlan:  
AP 192.168.4.1/24  
*CommanderBX\_servicetag*

wwan: none

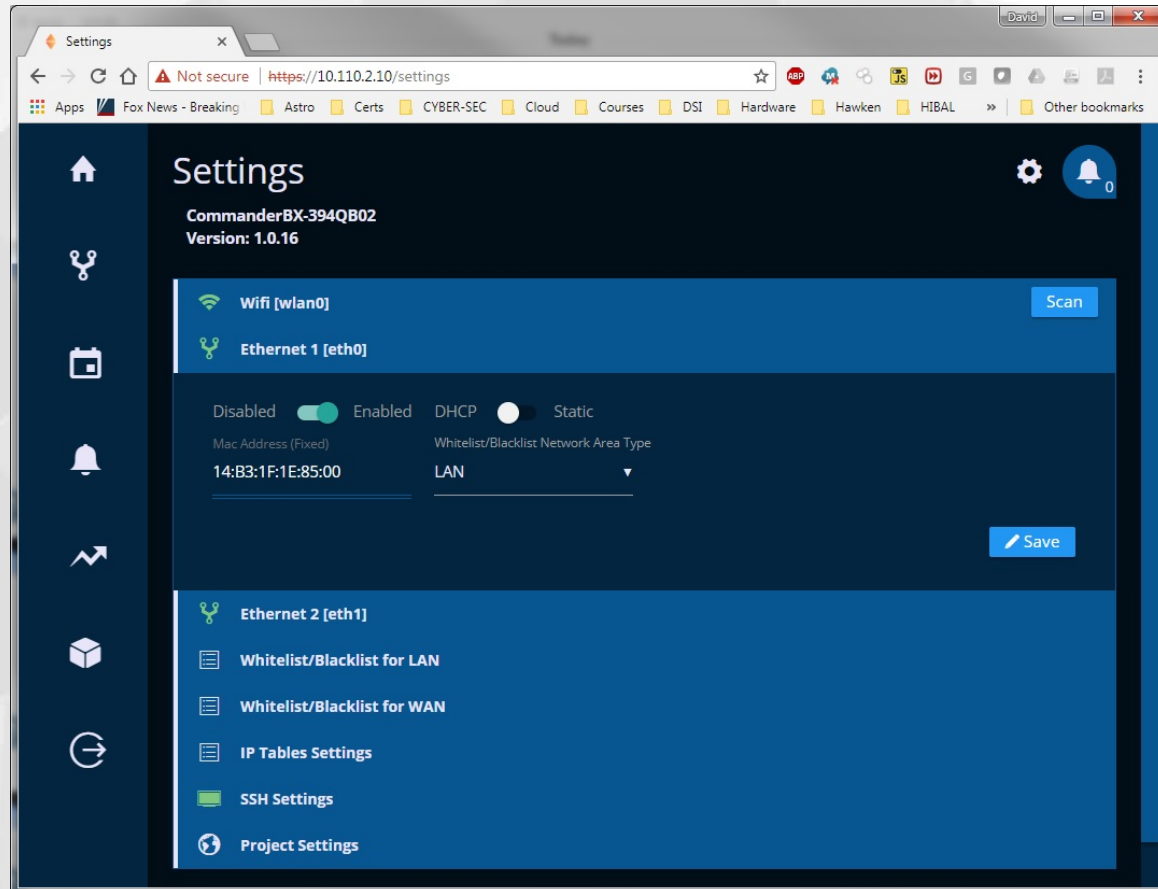
Commander will route from  
WiFi to Internet for you



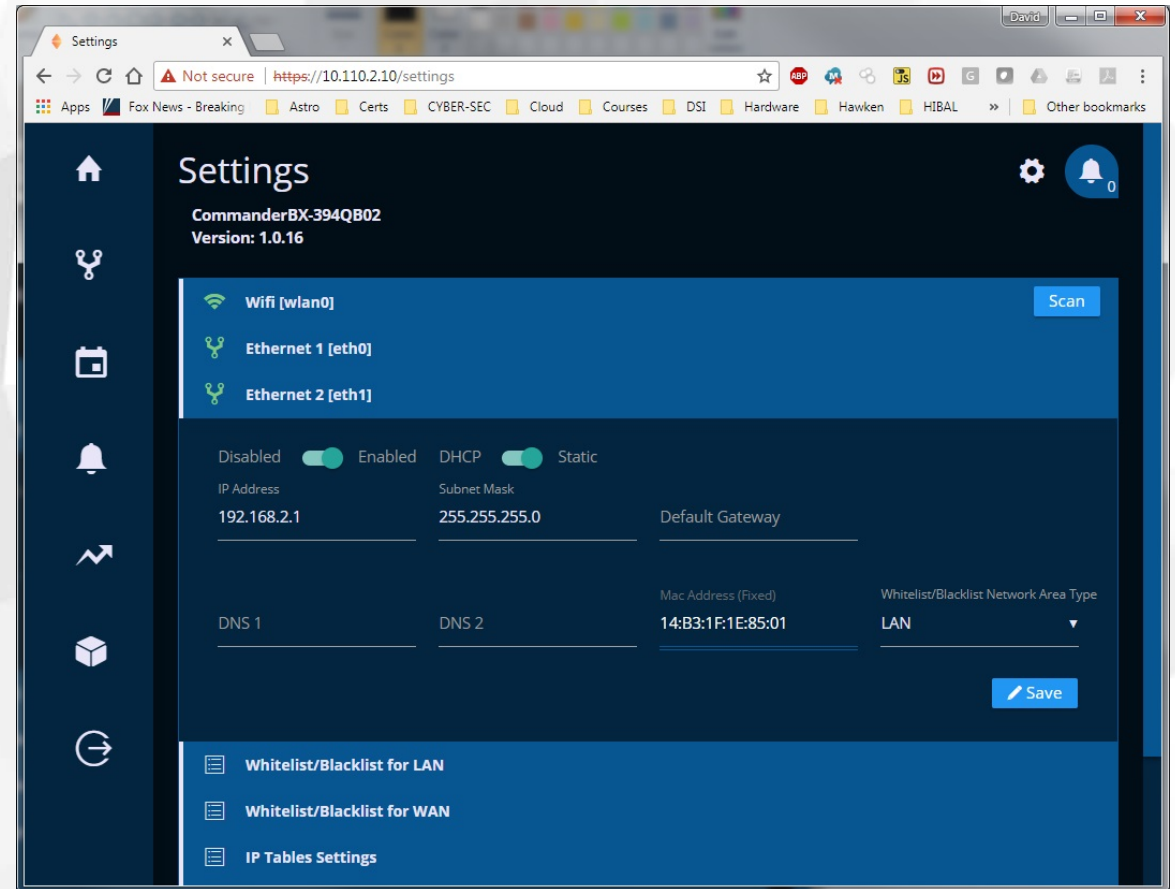
# Preliminaries – Ethernet



## Dynamic



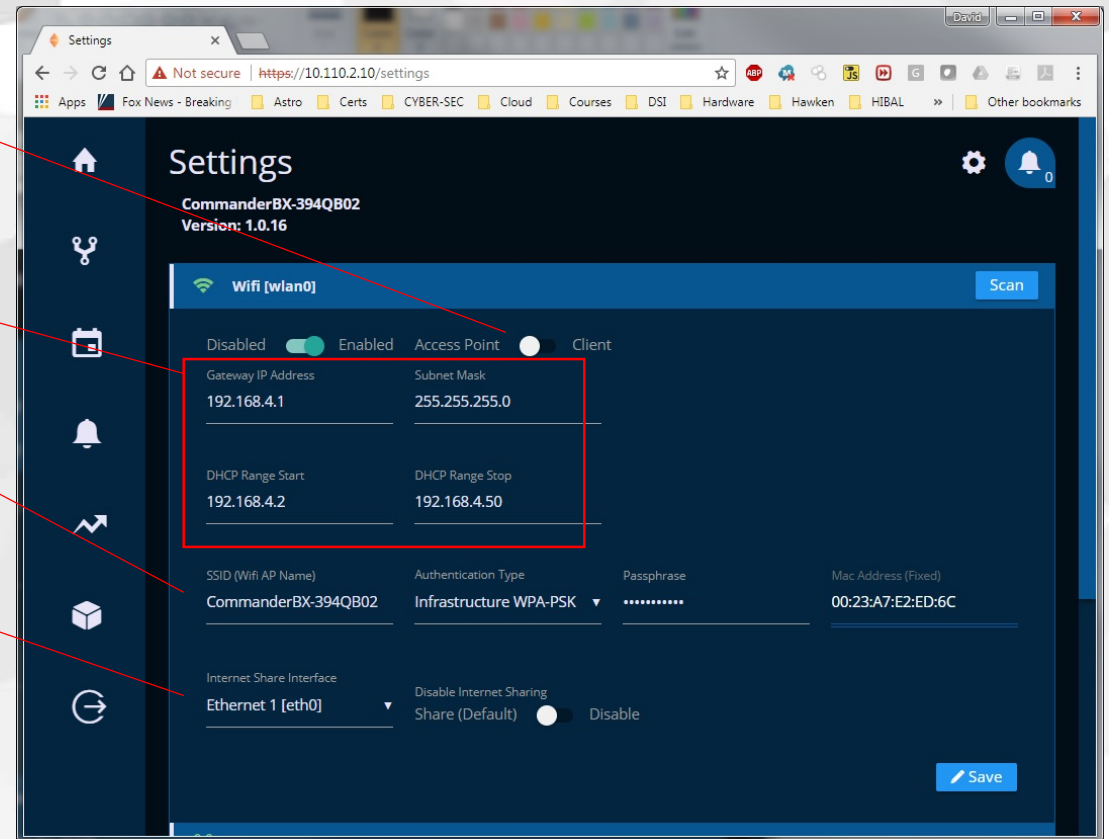
## Static w/o GW or DNS



# Preliminaries – WiFi



1. Default is AP, but can be client
2. Only used if AP
3. Don't forget to set
4. Only if AP



# Preliminaries – BACnet



## Devices on SAME subnet

The screenshot shows the 'Edit Network Network1' interface in KMC Commander. The 'Router' field is highlighted with a red box and is currently empty. Other fields include 'Source/Dest UDP Port' (47808), 'Destination BBMD Port' (empty), 'Instance Min' (0), and 'Instance Max' (4194303). The 'BACnet Network' and 'Destination Address' fields are also visible. At the bottom, there are 'Cancel' and 'Update' buttons, and a 'Site Explorer' panel showing a list of rooms: Room 210, Room 208, and Room 207.

## Devices on REMOTE subnet

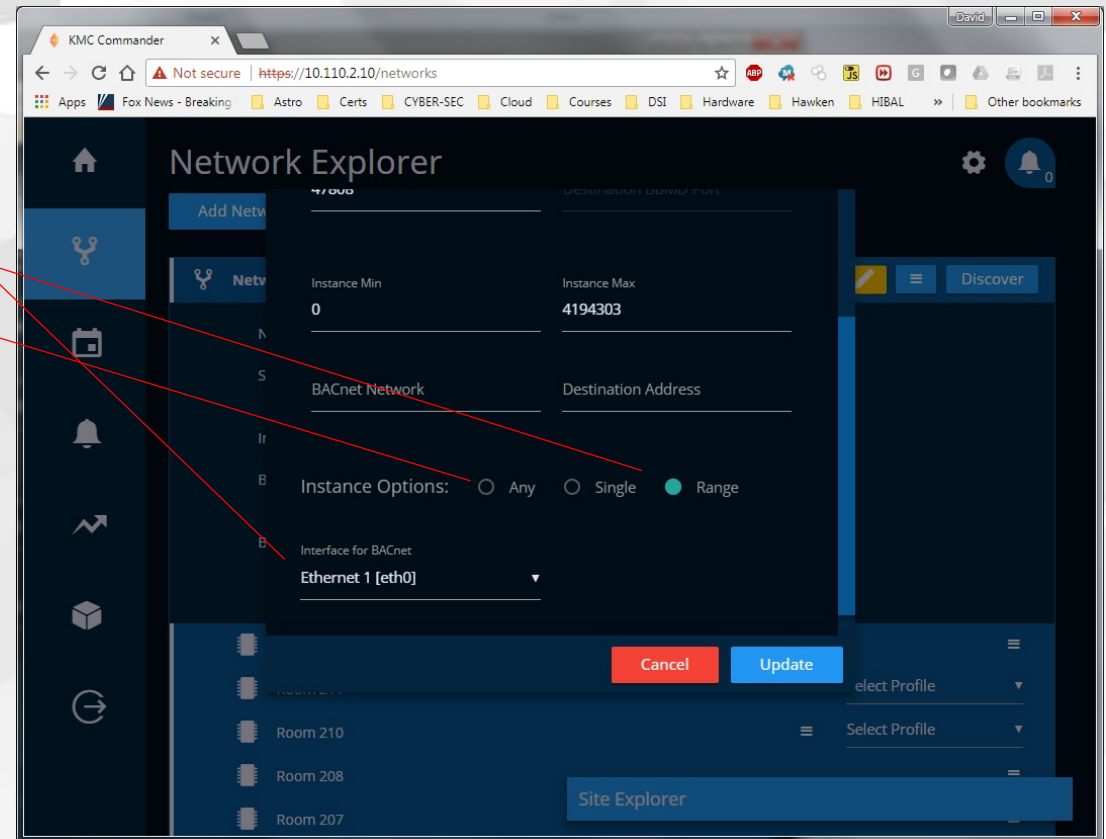
The screenshot shows the 'Edit Network Network1' interface in KMC Commander. The 'Router' field is highlighted with a red box and contains the IP address '10.3.3.18'. Other fields include 'Source/Dest UDP Port' (47808), 'Destination BBMD Port' (47813), 'Instance Min' (0), and 'Instance Max' (4194303). The 'BACnet Network' and 'Destination Address' fields are also visible. At the bottom, there are 'Cancel' and 'Update' buttons, and a 'Site Explorer' panel showing a list of rooms: Room 210, Room 208, and Room 207.

# Preliminaries – BACnet



1. Make sure you set Interface for BACnet
2. Usually can use Range
3. If not discover all, try Any

Commander is (almost) a Device; it is (definitely) NOT a BACnet Router





# Preliminaries – White Listing



## LAN:

10.0.0.0/8

172.16.0.0/12

192.168.0.0/16

(may need to add VPN)

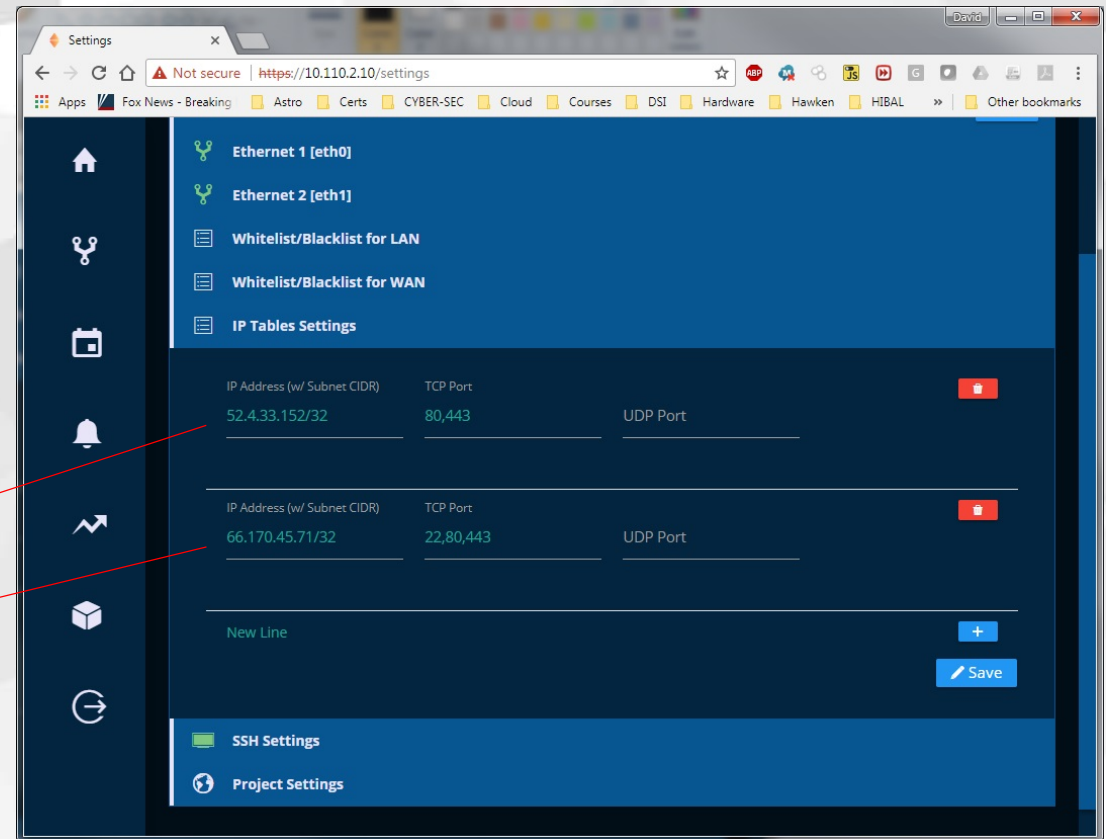
## WAN:

None

## IP Tables:

Data cloud

KMC





# Topology Scenarios

# Scenarios – Dual Purpose

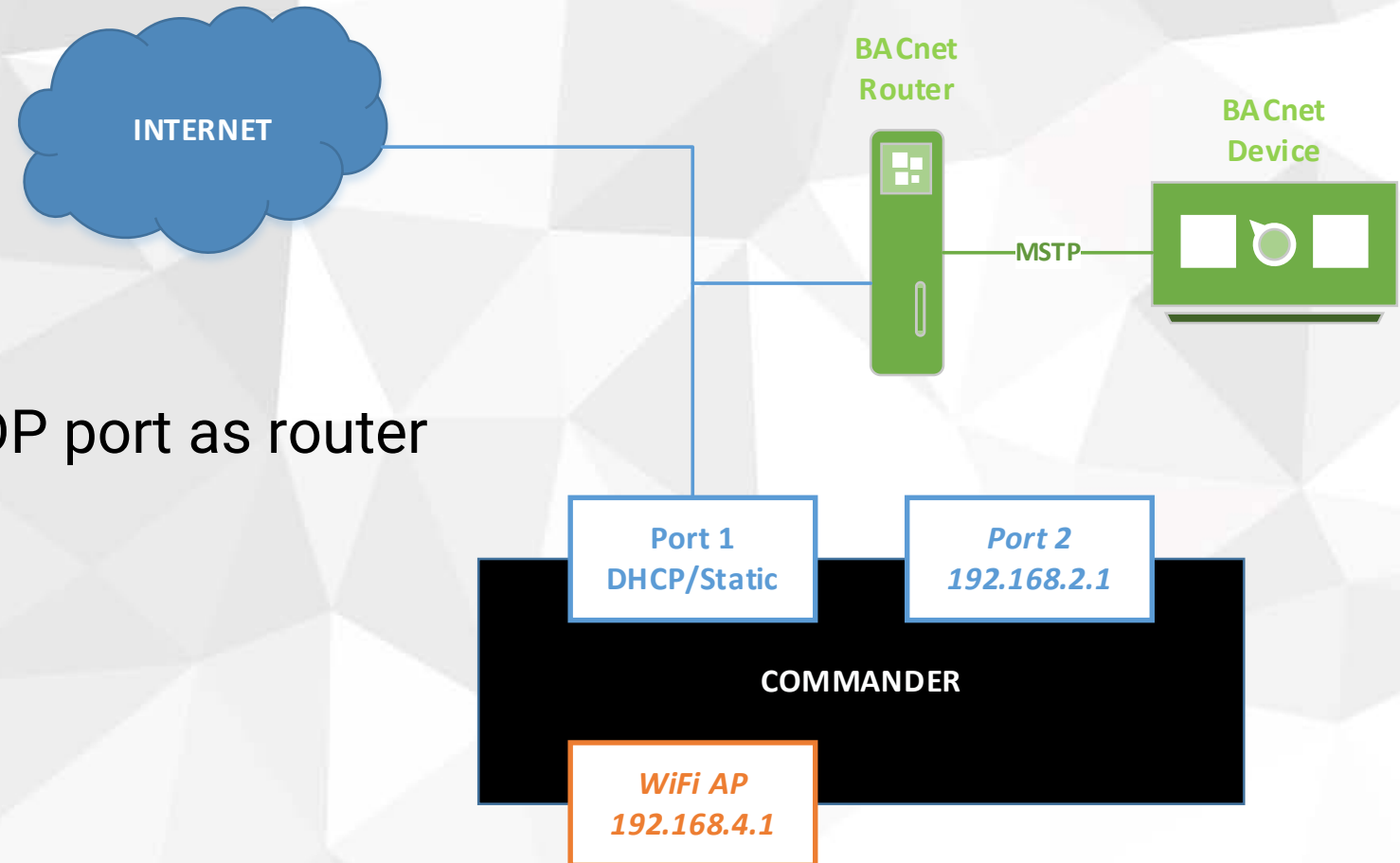


Port 1:

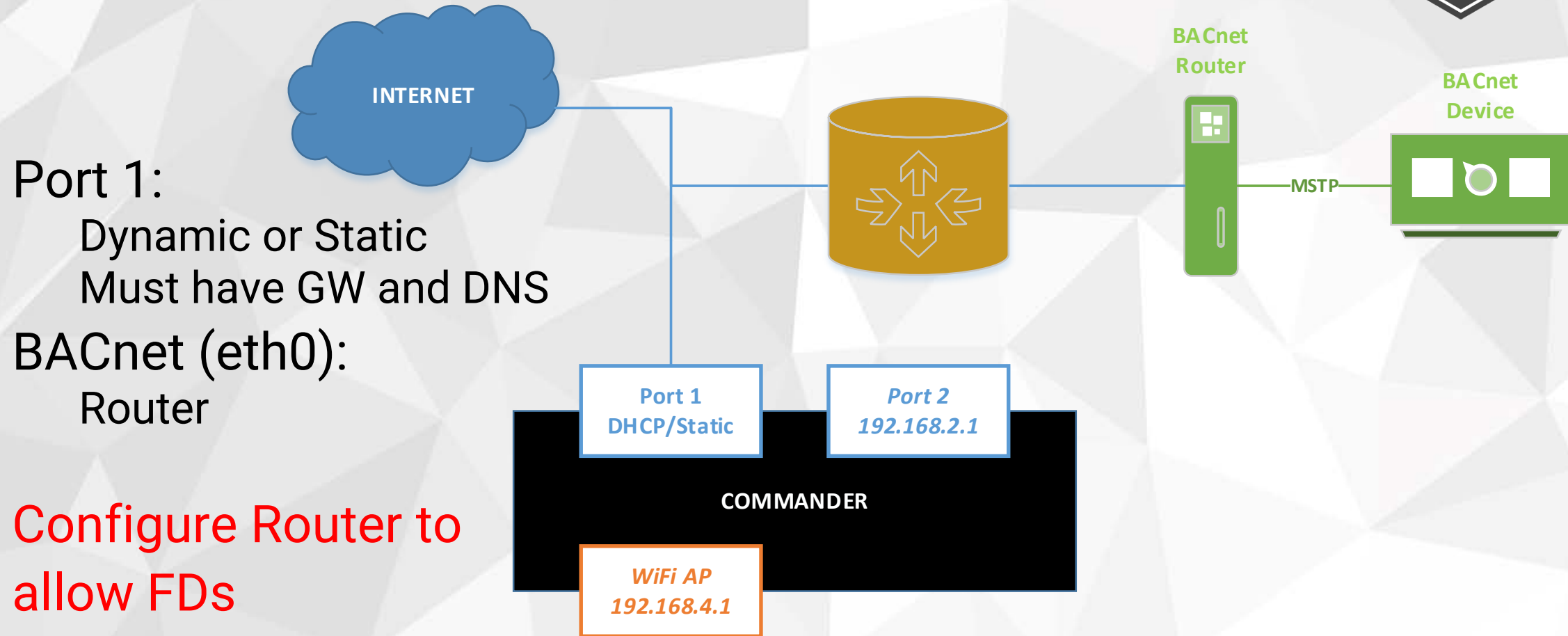
Dynamic or Static  
Must have GW and DNS

BACnet (eth0):

No Router (usually)  
Commander has same UDP port as router



# Scenarios – Remote Router



Port 1:

Dynamic or Static  
Must have GW and DNS

BACnet (eth0):  
Router

Configure Router to  
allow FDs

# Scenarios – Mixed Bag

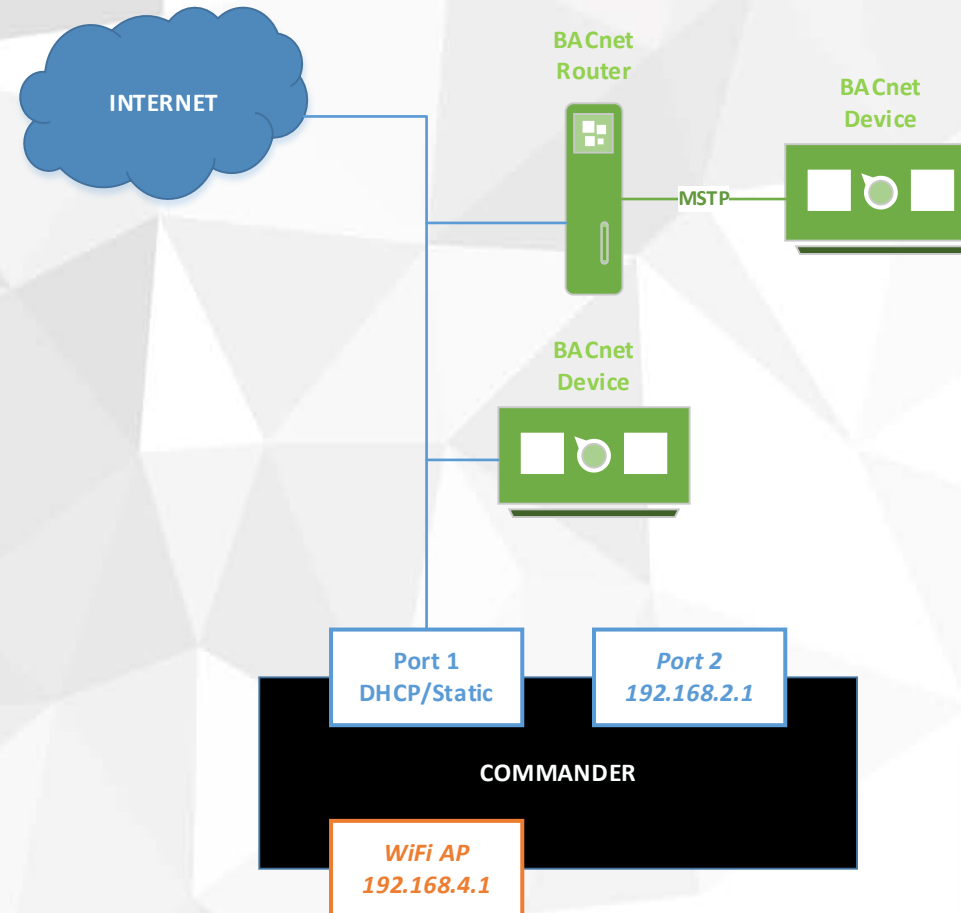


Port 1:

Dynamic or Static  
Must have GW and DNS

BACnet (eth0):

No router



# Scenarios – Really Mixed Bag

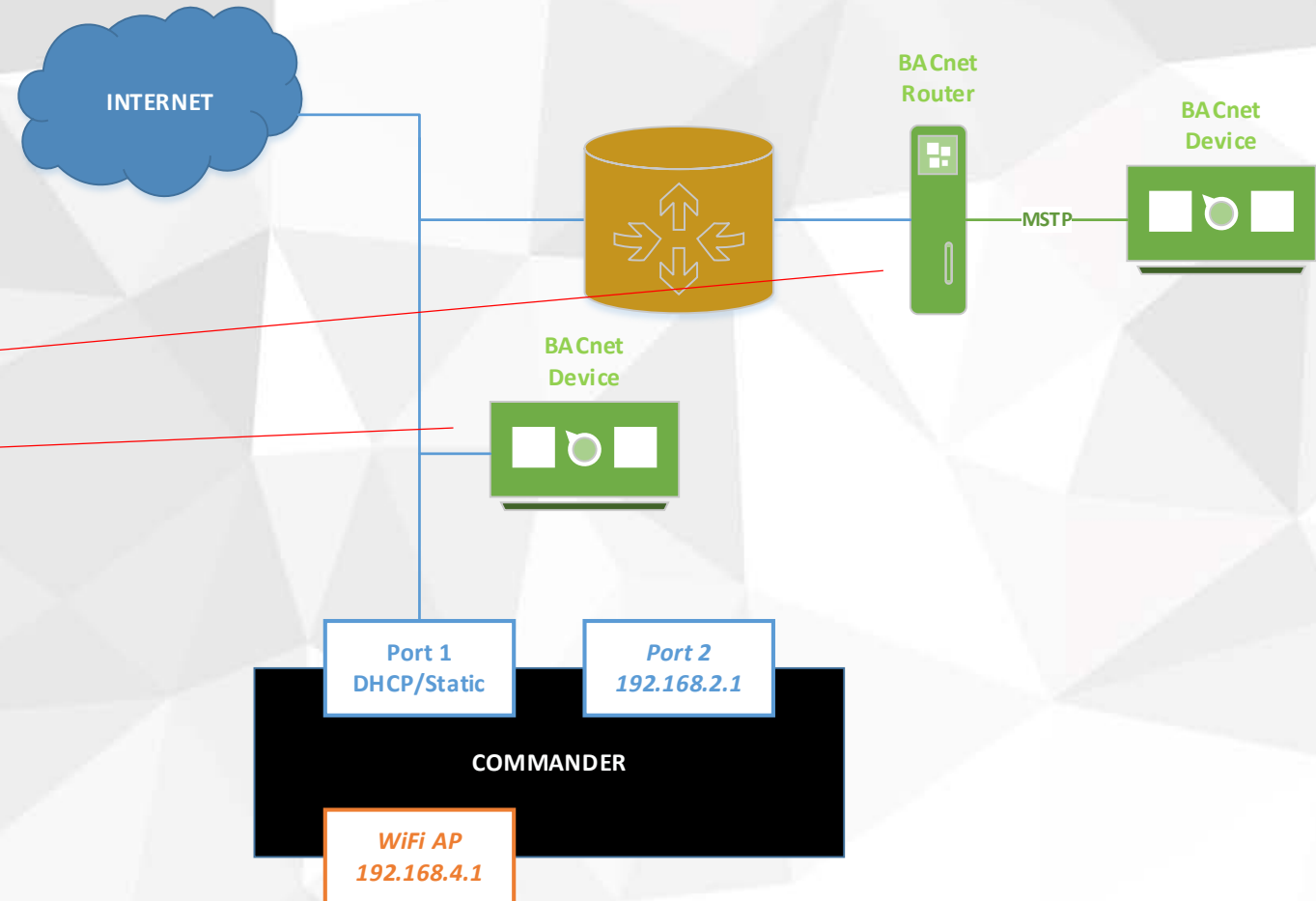


Port 1:

Dynamic or Static  
Must have GW and DNS

BACnet (eth0):

1. Router
2. No Router



# Scenarios – P1 / P2



## Port 1:

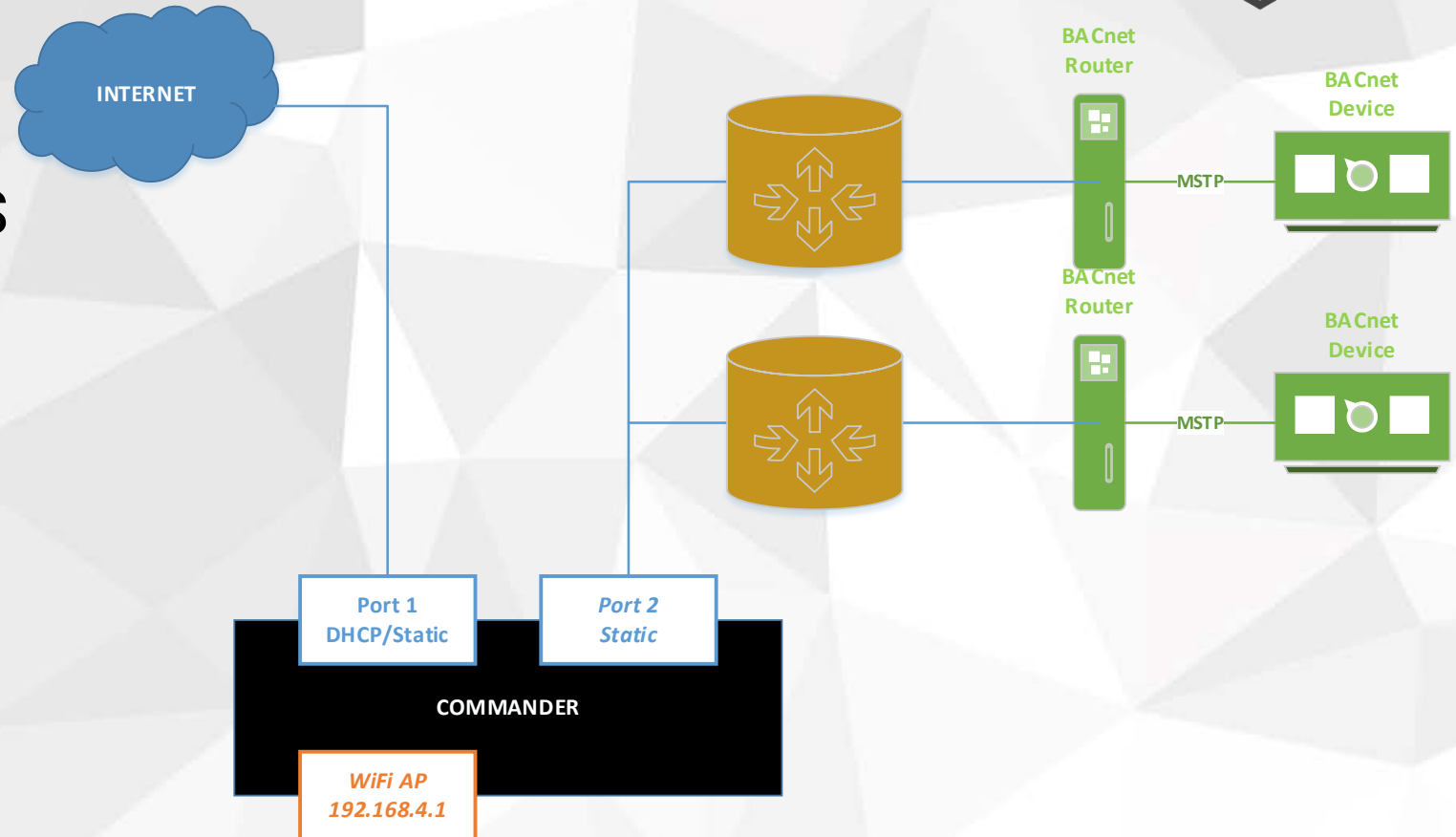
Dynamic or Static  
Must have GW and DNS

## Port 2:

Static  
Do NOT include GW

## BACnet (eth1):

1. Router A
2. Router B



# Scenarios – Wifi



Port 1:

Static

No GW and DNS

BACnet (eth0):

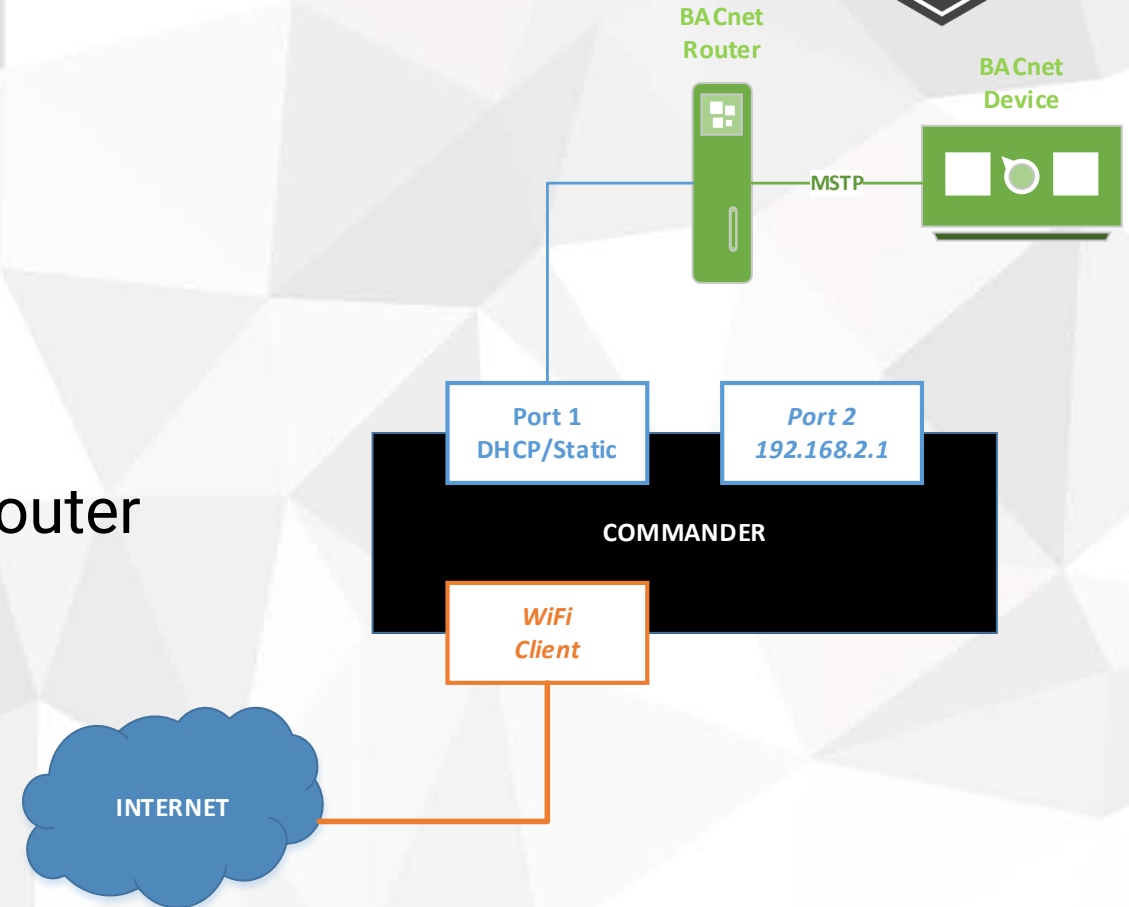
No Router (usually)

Commander has same UDP port as router

WiFi:

SSID / PSK

Must have Internet





# Scenarios – Cellular



Port 1:

Static

No GW and DNS

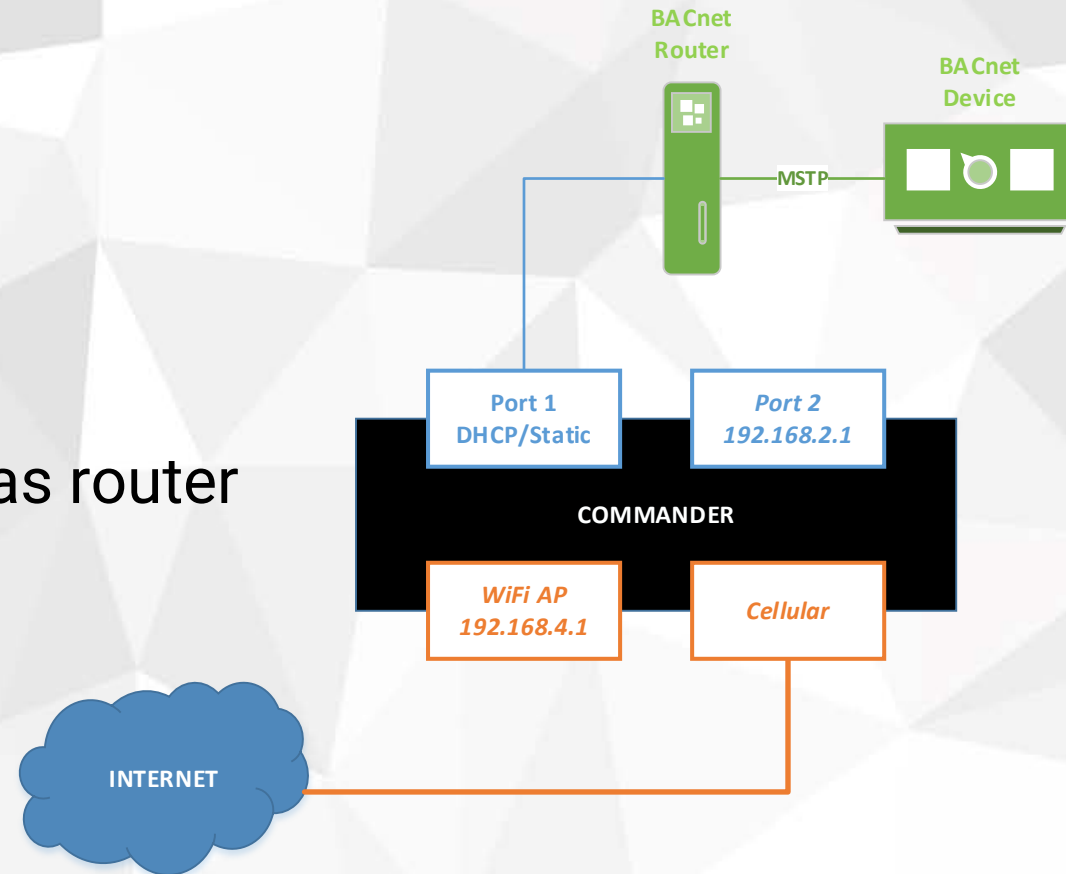
BACnet (eth0):

No Router (usually)

Commander has same UDP port as router

Cellular:

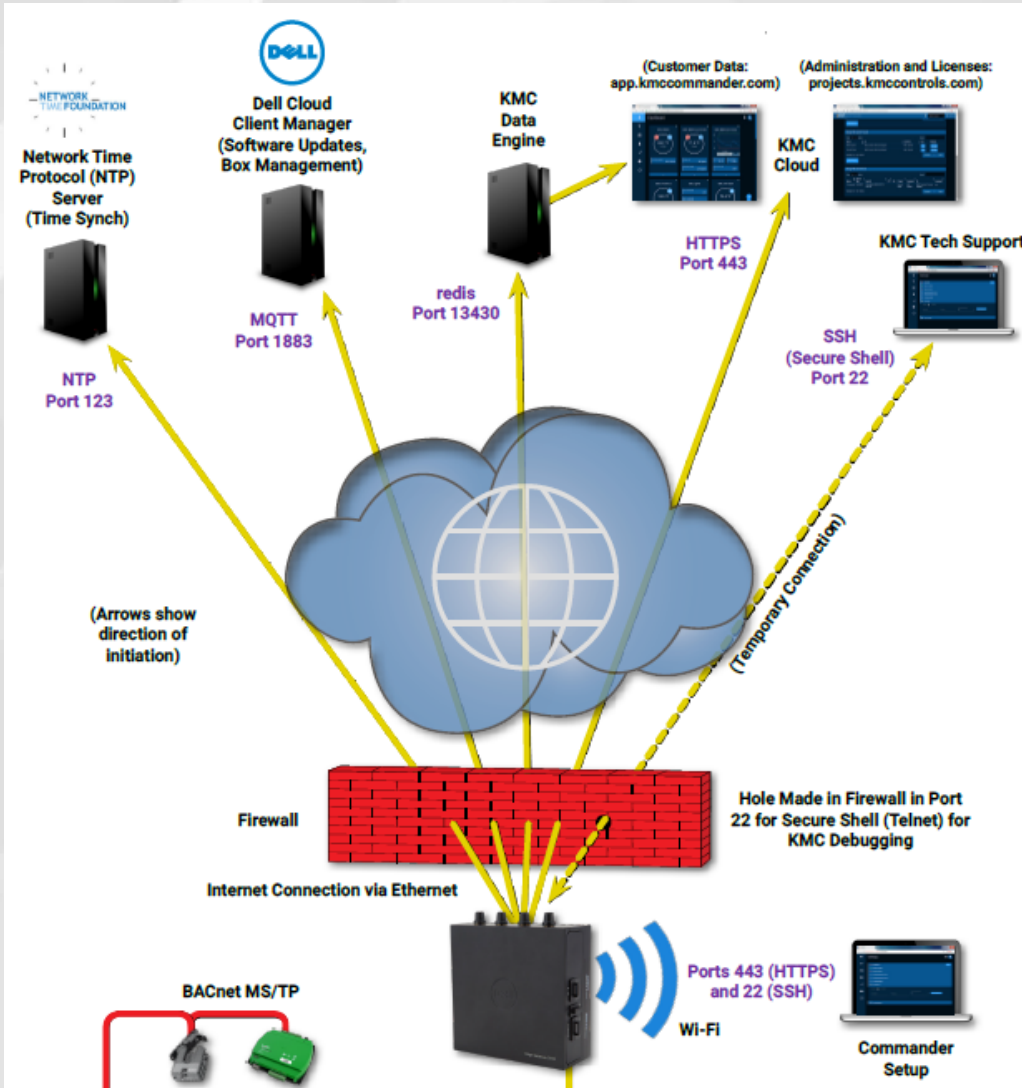
Set APN or not





# Network Summaries

# Summaries



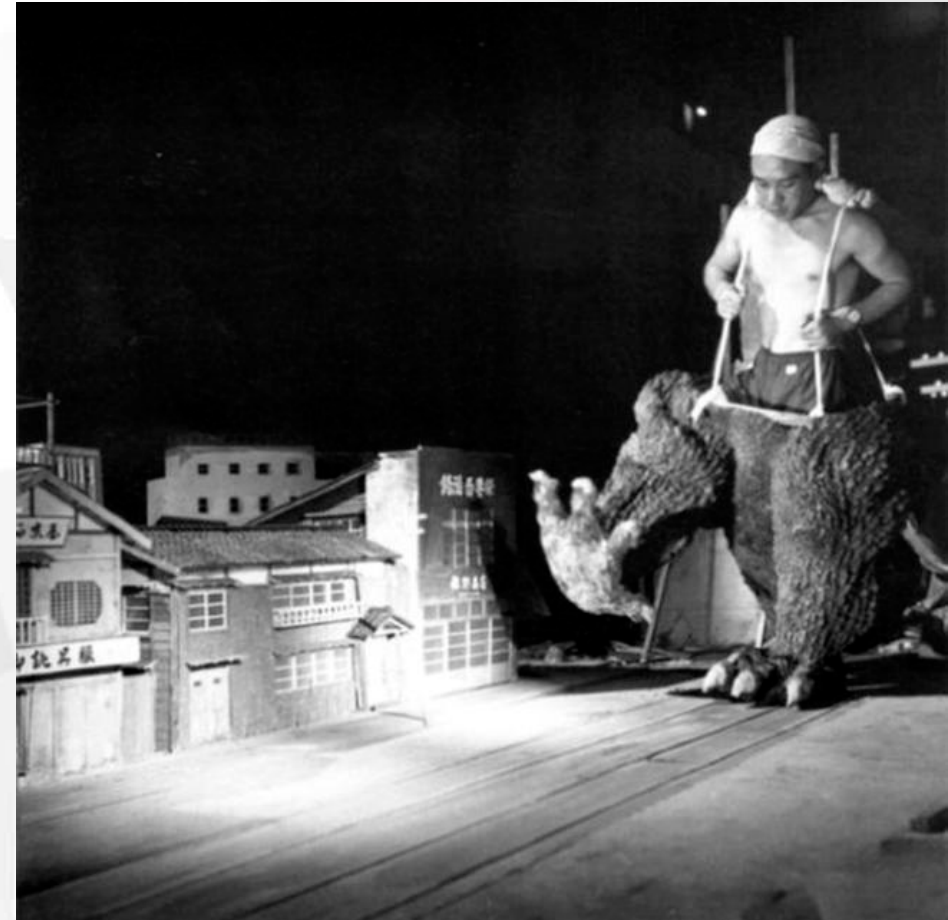
1. Commander initiates all messaging – the cloud services cannot initiate
2. Most jobs do not have Outbound rules... but many are starting to have them
3. If they do have Outbound policies, then these ports must be open
4. May be easier to go Cellular

# Summaries



BACnet is still BACnet

1. Commander is (almost) a Device
2. But can communicate with more than one network
3. Remote routers must allow Foreign Devices
4. Make sure UDP ports are correct



# Summaries



Coming Soon:

1. MODBUS
2. SNMP
3. What others?



If I ran NASA, it would be mandatory for the ground crew to be dressed as apes when the space shuttle lands.



**Thank you!**

**Gamification Code: JPS647**